Contextual Factors of Network Picture Formation: An Empirical Examination

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Abstract

The business network is a varying entity, depending on the perceptions of the actors within the network. Moreover, it has been posited that perceptions are important for actors' networking activities as well as for the outcomes of strategic actions. Given the recognised importance of actors' views, recently there has been growing research interest in this area. This paper aims at analysing how contextual factors affect the way individual managers perceive their surrounding network. For this purpose, an empirically derived dimensional model of network pictures was used which allows researchers and managers to grasp actors' distinct views of the surrounding business network. In a qualitative empirical study, this dimensional model is employed to assess which contextual factors affect actors' perceptions of the network. Multiple respondents in several companies representing two very different networks are used and network picture characteristics are compared between the two considered networks. Our findings show that manager's network picture characteristics are related to the features of their network, i.e. the continuity and the complexity of underlying business relations, the role played by formalisation and the level of embeddedness with regards to the sector in which companies developed their business activity. As such, our analysis contributes to a better understanding of managers' cognition in business networks, especially the contextual factors influencing network picture characteristics.

Keywords:

Network picture, business networks, managerial cognition, contextual factors

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1 Introduction

Companies are embedded in a network of interrelated relationships causing complexity (Axelsson and Easton 1992; 1989), thus, actors' subjective views are fundamental for an understanding of business network related phenomena (Anderson et al. 1994; Mattsson 1985; Mattsson 1987). Drawing on this observation, researchers within the business network tradition have developed ways to capture those views in a systematic way (Henneberg et al. 2006; Ramos and Ford 2009): the research tool of network pictures. Reviewing the business network body of literature, it is clear that recently there has been an increasing interest on the subject of network pictures (Ford and Redwood 2005; Henneberg et al. 2006; Henneberg et al. 2010; Mouzas et al. 2008b; Oberg et al. 2007; Ramos and Ford 2009; Ramos and Ford 2005; Ramos et al. 2005; Rohrmus and Henneberg 2006). One aspect that has scarcely been addressed is how individual beliefs about the business network are developed, that is to say, what are the factors that condition the way an individual manager perceives the surrounding network and how do they condition these perceptions(Leek and Mason 2008; Ramos and Ford 2007)?

We use the pre-tested dimensional model of network pictures suggested by (Ramos and Ford 2009) to assess the potential association between some contextual factors of the network on the one hand, and of individual network picture characteristics on the other. The empirical analysis includes 49 managers from diverse companies in two specific and unrelated networks. The analysis is carried out on a macro-level, i.e. at the network level. The findings point to the importance of network contextual factors in the formation of managers' perceptions.

The paper represents a theoretical contribution through enriching the existing literature on network pictures. There is also a managerial contribution, given that the study provides managers with an uncomplicated technique to have some first thoughts on how actors' views of the business network may look like.

The paper is structured as follows. We begin by framing this research via literature on business networks. This is followed by a brief introduction of network pictures and the dimensional model that was previously developed as a research device to capture managers' understanding of their network. The potential role played by contextual factors on the formation of individual perceptions of business networks is discussed and, after describing our methodological choices and research design, we explore the main findings that result from the analysis. A final section is used do discuss the main theoretical and managerial contributions of this paper, as well as some limitations. Future avenues for research are put forward.

2 Business Networks and Actors' Subjective Perceptions

The industrial network approach was developed drawing mainly on principles underlying the resource dependence theory (Pfeffer and Salancik 1978) and the social exchange and network theory (Cook and Emerson 1978). This IN approach provides business marketing researchers with a tool to understand the role played by actors in industrial settings (Axelsson and Easton 1992; Hakansson and Johanson 1992; Hakansson and Snehota 1995a). According to the IN approach, companies interact within a complex world of interconnected relationships (Hakansson and Snehota 1989). The complexity that can be found in industrial systems is partly associated with the underlying interconnectedness of business relationships (Anderson et al. 1994; Easton 1995; Easton and Araujo 1992; Ford et al. 2002; Mattsson 2002), resulting in actors (un)consciously developing frameworks (Weick 1969) that helps them to understand and to deal with that complexity. These frameworks are also known as cognitive structures (Johanson and Mattsson 1992). Organisational networks are therefore not an independently existing phenomenon, but instead the result of actors' subjective views of the world (Ford et al. 2002; Hakansson and Snehota 1995a). The importance played by subjective views for an understanding of business network phenomena was initially raised by Mattson (1985; 1987) and was conceptualised in the business network literature later in Ford et al.'s (2002) model of managing in network. This model introduced the concept of network pictures, or

actors' views of the world, and the idea that these were strongly interconnected with networking and network outcomes.

Researchers drawing on the business network tradition have operationalised the construct of network pictures as actors' sense-making devices (Henneberg et al. 2006). Ford et al. (2006) have recently put forward a new definition for network pictures, defining them as "*a conceptualisation by the observer of the network views of the participants, [...] a representational technique that aims to capture or illustrate views that specific actors have of the networked environment within which they operate*" (p. 2). Network pictures are therefore a research device that researchers and managers can use to grasp how individual understand their surrounding business network. Ramos et al. (2009) have developed such a research device by empirically deriving a dimensional model that captures in a systematic way those individual perceptions.

There has been an increasing research interest in the subject of network pictures, which is reflected in the growing number of publications in this area (Ford and Redwood 2005; Henneberg et al. 2006; Mouzas et al. 2008b; Oberg et al. 2007; Ramos and Ford 2009; Ramos and Ford 2005; Ramos et al. 2005; Rohrmus and Henneberg 2006). Beyond focusing on the operationalisation of actors' network pictures (Henneberg et al. 2006; Ramos and Ford 2009), other studies have used the concept to address issues of change in organizational networks (Abrahamsen et al. 2009; Ford and Redwood 2005; Kragh and Andersen 2008; Oberg et al. 2007). Further research can be found on how a counterpart's perceptions can be mobilised towards a specific end (Holmen et al. 2008). One aspect that has scarcely been addressed is how an actor's perception of the business network is developed, that is to say, what are the factors that condition the way an individual perceives the surrounding network (Henneberg et al. 2009; Leek and Mason 2008; Ramos and Ford 2007; Rohrmus and Henneberg 2006).

Mattsson (1985) points out how managers appear to perceive the network on the basis of previous experiences, memories and beliefs about the future. However, until recently, no significant empirical work has been developed to assess the role played by situational and contextual factors in the formation of individual perceptions of the organizational network. Building on insights from

cognitive science, social psychology, organisational behaviour and strategic management, Rohrmus and Henneberg (2006) suggested several propositions on the structure and content of network pictures. They highlight the potential role that some contextual factors, namely hierarchy and function within a company, or company position within a network, may have in the definition of individual perceptions of the business network. Ramos and Ford (2007) initiated the discussion on how the features of a business network affects the views of those actors that interact within that network; Leek and Mason (2008) carried out a within-company analysis and concluded that different hierarchical positions resulted in different ways of perceiving the surrounding network. As part of this present paper we aim to develop further the discussion of the role played by contextual factors in the formation of individual perceptions of the network. We do so by carrying out an analysis across two different networks. The empirical analysis uses the model of network pictures developed by Ramos et al. (2009); for this reason, in the following section this dimensional model is briefly described.

3 Dimensional Model of Network Pictures

To develop the research tool of network pictures, Ramos et al. (2009) began by theoretically deriving a structure that would allow grasping individual perceptions of the business network. Three parsimonious elements were identified in the literature, namely 1) scale and structure, 2) processes, and 3) positioning. Scale and structure is about the number (Anderson et al. 1994; Ford et al. 2002; Holmen and Pedersen 2003; Holmen and Pedersen 2001) and the characteristics (Ford et al. 2003; Ford and Havila 2003; Hakansson and Snehota 1995a) of actors that are identified in the business network; the processes are about the nature of the identified relationships that take place between actors (Hakansson and Snehota 1995a); and finally, positioning is related to the place occupied in the business network by the self and by others (Hakansson and Snehota 1995a; Johanson and Mattsson 1985). Ramos et al. (2009) posit that based on these three elements a more granulated set of network pictures dimensions could be found. Analysis of a set of collected network pictures resulted in the identification of twenty-one network picture dimensions that were divided into four groups

(Krippendorff 2004, p. 167): focus, weight, consistency and specificity, and overall view of the surroundings.

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Insert Figure 1.

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The identification of the sub-dimensions that could best describe how each respondent perceived the business network was not a matter of *frequency* but instead of *intensity*. The definition of *intensity* resulted from evaluating the passion or strength associated with each possible sub-dimension of a particular dimension. A brief description of each dimension identified in this empirically derived model of network pictures is included in table 1.

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Insert Table 1

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4 Contextual Factors and Actors' Views of the Business Network

Individual perceptions of the business network result from individual enactment processes (Meindl et al. 1994; Weick 2001; Weick 1969). Therefore, perceptions are subjectively held by individuals and not by companies or networks (Ford et al. 2002; Hedaa and Tornross 1997; Henneberg et al. 2006). "The real world is actually the world that is idiosyncratic, egocentric and unique to each person" (Weick 2001, p. 71). Moreover, because each individual has singular experiences, memories and access to information (Mattsson 1987), as well as goals, interests and philosophies (Hakansson and Snehota 1995a), distinct individuals are expected to hold different (Ford et al. 2003; Salmi et al. 2001), and even contradictory (Mouzas et al. 2004) views of the business network. Despite being individual and idiosyncratic, actors' understanding of the business network not only results from individual cognitive processes, they are also the product of social interaction (Mouzas et al. 2008a; Rohrmus and Henneberg 2006; Weick 1995). It is not possible to dissociate individuals from the social dimension, as they are fundamental aspects of each other (Walsh and Ungson 1991).

Therefore, individual perceptions may be expected to be affected by, as well as to affect the social context in which those perceptions are formed (Rohrmus and Henneberg 2006). In a business environment, the context of social dynamics where 'learning' takes place (Argyris and Schon 1978; Ford and Thomas 1995; Kim 1993; Tsoukas 1996) is defined by the organisation and the network where individuals' business activity is developed. In practical terms, this means that although there is always diversity within a company or network regarding actors' views of their surrounding, because those views are inter-subjectively generated amongst individuals that belong to the same context, some commonality may also be expected to exist (Morgan 1986).

4.1 Company Commonality of Network Pictures

Research in the managerial and organisational cognitive field show that, although it is almost impossible to find a framework that is permanently shared by all members of an organisation, some shared commonality that results amongst other things from organisational culture and sub-cultures, may be expected to exist (Langfield-Smith 1992; Schein 1985; Simon 1953; Smircich 1983; Sproull 1981). Welch and Wilkinson (2002) define this partially common view as an organisation's 'schema', "the product of the interaction among the schemas of those individuals comprising it, i.e., schemas are co-produced within the organisation through the internal and external interactions of its members" (p. 33). There is nevertheless no room for reification of the individual views at the company level. Instead, as suggested in the managerial and organisational cognitive field of research, company's internal relationships of power and dependence amongst individuals or functions play an important role in the definition of the overall perspective that may prevail amongst the members of a same company (Cook and Emerson 1978; Walsh and Fahey 1986; Walsh et al. 1988). Alternatively, there may also be a relatively consensual view of the network, originated by internal coordinating mechanisms that reduce potential within-company differences of how individuals perceive the network (Langfield-Smith 1992). The within-company consensual view of the networks may also be associated with a company's culture and values which are shared by all members of the organisation (Morgan 1986; Schein 1985; Simon 1953; Smircich 1983; Sproull 1981; Weick 1979a; Weick 1995).

4.2 Network Commonality of Network Pictures

A certain extent of within-network commonality may also be expected to exist (Rohrmus and Henneberg 2006; Walsh 1995). By socially interacting with members from other companies, individuals may be expected to integrate aspects from other organisational cultures into their perspective of the business network. “The actors (companies) have no common goals, but there exist some shared beliefs about the activity pattern as well as the resource constellation” (Hakansson and Snehota 1995a, p. 40). In a study conducted in managerial and organizational cognition regarding the competitive group literature and, Porac et al. (1989) observed the formation of “cognitive oligopolies”, a form of shared mental representations of an industry. These oligopolies reflect the collective mental maps of the main competitors of an industry, resulting from a mutual enactment process which controls the flow of information in order to maintain the same beliefs. The encountered “common stereotypes” may also be a result of the increase of interactions and experiences among the network participants, which can lead to something that resembles a “network culture”. According to Spender (1989), there exists a “shared knowledge-base that those socialized in an industry take as familiar professional common sense” (p. 69). Over time, shared perceptions are generated and individual frameworks may result in a socially reinforced view of the world (Berger and Luckmann 1966; Porac et al. 1989), one that may reflect some form of ‘common stereotyping’ (Ford et al. 2002; Halinen and Salmi 1999; Henneberg et al. 2006). Companies try (more or less consciously) to generate some shared beliefs, both at the dyadic and network level. Welch and Wilkinson (2002) referred to the process of coordination between the views of the world held in different organisations as the *schema coupling*. This coupling reflects “the way the schemas of two organisations become interrelated and adapted to each other over time, in such a way as to be consistent with the ongoing relationship” (p. 33). These authors highlighted that this *schema coupling* is the result of companies’ desire to maintain compliance with the co-existent cognitions. They argued that coordination takes place not only at the relational level, but also at the network level, reflecting a network’s “pattern of beliefs and values” (Welch and Wilkinson 2002, p. 33). Sometimes, there are ‘common stereotypes’ that are shared by most of the relevant actors (Ford et al. 2002; Halinen and Salmi 1999; Henneberg et al. 2006); ‘common stereotypes’ may restrict the

participants' views of the business network, reflecting what Weick (1979b) labelled as 'collective ignorance'.

The literature from several bodies of research, i.e. from managerial and organisational cognitive science, social psychology, organisational behaviour and strategic management, therefore points to the relevance of individual, organisational, and network factors in the formation of individual perceptions of their surrounding. The aim of this paper is to address specifically the relevance of network contextual factors in the formation of actors' understanding of the business network. Besides looking into some aspects that were posited by Rohrmus and Henneberg. (2006) on the relation between network contextual factors and individual perceptions of the network, our aim is to explore if there are any network features that have a direct impact on network pictures characteristics. Regarding Rohrmus and Henneberg's (2006) work, we are particularly interested in addressing the relation between network picture similarities and the following factors: the strength of ties between individuals (Ford and Bacus 1987; Granovetter 1985), the clarity in the definition of network boundaries (Porac and Rosa 1996; Porac et al. 1989; Porac et al. 1995), and the strength of shared norms and practices (Argyris and Schon 1978; Daniels et al. 2002; Porac et al. 1995).

5 Methodological Choices and Research Design

The individual manager was defined as the primary unit of analysis (Yin, 1993), a consequence of network pictures being held by individuals. Respondents were selected from companies in two particular networks that present distinct features regarding their relational structure (Lambe et al. 2000). The research included one level of analysis, namely a macro level, i.e. between different networks.

In total, forty-nine individuals that played a key role in their companies' decision-making processes (i.e. CEO and other performing management roles, namely directors) were selected.

The respondents come from eighteen companies in two different networks: one '*Product Network*' and a '*Project Network*'. The '*Product Network*' was associated with a long-term and high relational exchange situation, with most of the considered companies being somehow associated with a 'hole-

through-the-wall' production and delivery system. For this situation, a network of companies which were connected to the production of plastic containers was considered, a sector where there was an increasing practice of the 'hole-through-the-wall' system. The selected companies included producers of plastic containers (i.e. Beta, Alpha, Gamma, Omega and Omicron), as well as their suppliers (i.e. Delta, Zeta) and Lambda and clients (i.e. Theta, Kappa and Sigma). Companies were identified by a snowballing or chain process (Gray 2004; Ritchie and Lewis 2003); the first chosen company, Alpha, was relatively easy to get access to, had notoriety in the media and was the European pioneer for the 'hole-through-the-wall' production and delivery system (see table 2 and figure 2). The '*Project Network*' on the other hand could be characterised as a form of short-term and low relational exchange. For this situation, a network of companies involved in a project related to the transportation sector, namely to the conception, construction and operation of a Metro system, was included (see table 3 and figure 3). The first stage of execution of the project was about to finish and its operation was already underway when we collected the data. Included in this network were: the sole client of the project (i.e. Oak), two consortia of companies (i.e. Chestnut and Willow) and some of the companies that belonged to these consortia (i.e. Hazel, Elm and Aspen). All included companies were therefore directly associated with this project that was, and also directly with the consortium of companies that played the role of sole supplier for the project's client. There was one company that, although not being formally part of the supplying consortium, had a *back-to-back agreement* with one of the companies that were part of that consortium [i.e. Pine]. The company selection process for this network was similar to that used for the '*Product Network*'.

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Insert Table 2/ 3 and Figure 2 / 3

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These two networks provide us with two distinct contexts at the network level. In the following section there is a more detailed description of the features associated with each selected network.

For the data collection, and with the aim of assuring a greater reliability of the collected data (Denzin 1978) as well as to provide researchers and respondents with a more structured and clearer idea of

what was being said (Henneberg et al. 2010), we used a combination of visual and verbal data gathering techniques (Meyer 1991; Zuboff 1989). On a first stage, we elicited respondents' representations of their surrounding network, asking them to represent on a bland A4 sheet how they perceived their surroundings and to explain what they had represent and the reasons why they hade represented it in those terms. On a second stage, there was a semi-structured interview. The interview guide was developed based on the theoretically derived structure of network pictures suggested by Ramos et al. (2009). After the data was collected, we used the empirically derived dimensional model of network pictures suggested by Ramos et al. (2009) to code all the interviews and to characterise each respondent's network picture. At this stage, we had forty-nine network pictures that corresponded to forty-nine respondents from eighteen companies and two distinct networks. By looking for diversity and commonality at the network level, we were able to assess if there were any correlation between network contextual factors and the characteristics of the captured network pictures. We began by doing a clustering analysis of the captured forty-nine network pictures, looking for within-network commonality and between-network diversity. For this cluster analysis, we used binary variables (i.e. a sub-dimension found an expression in the respondent's network pictures, or it did not) to code the data. The binary variables for each sub-dimension were combined into a dimensional score, called a category. This category represented the structure of salient sub-dimensions within a specific network picture dimension. The quantitative data for the clustering was therefore obtained by converting each respondent's network picture into a set of categories, one for each dimension. The hierarchical cluster analysis was applied based on average linkage between-group linkage by SPSS. By the use of the generated dendrogram, four clusters of respondents were identified, i.e. grouping of respondents that perceived the business network in similar terms. For each cluster, the dominant features of the network pictures were identified. The aim was to understand whether network contextual factors could explain the differences found between these four clustered groups of network pictures. Afterwards, we compared the extent of within-network similarity of network pictures for each considered network to assess the aspects that were posited by Rohrmus et al. (2006) regarding network pictures similarity at the network level.

6 The Selected Networks

The main relational exchange features associated with each network selected to carry out the empirical analysis are discussed with this section. There is also a description of the main characteristics of each network.

Underlying the evolutionary model of relational exchange ingrained in the business network theory (Ford 1980; Hakansson 1982; Hakansson and Snehota 1995a; Johanson and Mattsson 1987; Morgan and Hunt 1994) is the assumption that so that relationships can be functional, they must hold certain attributes. Some of these expected attributes are as follows: trust (Dwyer et al. 1987; Morgan and Hunt 1994), commitment (Moorman et al. 1992; Morgan and Hunt 1994), adaptation (Ford 1980; Hallen et al. 1991), cooperation (Hallen and Sandstrom 1991), communication (Anderson and Naurus 1990), norms (Heide and John 1990), mutual goals (Morgan and Hunt 1994), and social bonds (Wilson 1995). Moreover, high levels of these relational attributes can only be achieved if the relationship go through various stages which took place over a medium or long term period (Anderson and Weitz 1990; Dwyer et al. 1987; Ford 1980; Hakansson 1982; Hallen et al. 1991; Wilson 1995); continuity is therefore considered a pre-condition for relational development to take place (Hakansson and Snehota 1995b). However, Lambe et al. (2000) identified a form of exchange which is not congruent with the evolutionary model of relational exchange: *interimistic* relational exchange. This form of exchange presents nevertheless the features that allow for differentiating it from transactional exchange and identifying it with relational exchange: some relational exchange situations are short-term or interim and present low expectation on future transactions. This form of exchange therefore presents quite distinct relationship attributes to those that were associated with an underlying continuity (Hakansson and Snehota 1995b), reflecting the inadequacy of the model of relationship development that is drawn up as an evolutionary process (Lambe et al. 2000). These authors suggest that the relational exchange continuum should therefore be bifurcated into *enduring* (i.e. long-term) and *interimistic* (i.e. short-term) relational exchange.

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Lambe et al. (2000) used a time analysis to compare *enduring* with *interimistic* relational exchange, and suggested that in the latter partners do not have as much time to develop relationship attributes. Therefore, there is an eminent need to develop a non-evolutionary relationship development model in order to explain *interimistic* relationships. Moreover, some relationship attributes that are considered necessary to make a relationship become functional show lower levels in the interim exchange than in the enduring form (e.g. lower levels of trust, commitment and communication). Finally, *interimistic* relations seem to rely more on non-relational or governance mechanisms (partners have less time for relationships specific norms; e.g. reciprocity). *Interimistic* exchange thus seems to rely simultaneously on Williamson's transaction cost analysis (Cook and Emerson 1978) and on social exchange theory (Eden and Spender 1998; Huff 1990; Sims and Gioia 1986).

The two networks that we included in the empirical analysis represent the two opposite situations of relational exchange: the *enduring* and the *interimistic* relational exchange.

The '*Product Network*'

Our '*Product Network*' is a good example of an enduring relational exchange situation. In a 'hole-through-the-wall' production and delivery system the supplier is present with his own machinery and personnel at the client's *house* for a (usually) long period of time. The production and delivery thus takes place within the client's facilities, corresponding to what is known as *in-house* or *integrated outsourcing*. The *in house* plants usually have a local management, being responsible for the management of the raw materials, machinery maintenance and production process, but share with other units the central services, support and R&D that are provided by the headquarters. The usually long term agreements that are established between the supplier and buyer are a consequence of the high and tailored investments in machinery and equipment that are made for single-client units. There is frequently a tight collaboration between the technical and technological areas of supplier and client, as well as joint planning between supplier and client to assure a *just-in-time* delivery that

is made directly to the point in the production line where it is required[1]; there is also commonly an improved quality and communication between supplier and buyer. Instead of a normal supplier-buyer relationship, the involved parties claim to be involved in what appears to be a *partnership* situation where there is usually a high stability and very close relationships. This is expected to lead to very particular relationship features between supplier and buyer.

From a time perspective, this situation corresponds to the most relational part of the relationship exchange continuum. Bearing in mind Lambe et al.'s (2000) belief that time plays an important role for relationship-building interactions, in this situation there is more time available for more interactions to take place and more opportunities for relationship building, than in a *normal* relationship where the client is supplied from outside his facilities. The high adaptation and investments carried out at the beginning constitute a strong impulse for trust building, and previous experiences of the supplier in other *in plant* solutions may assume a central role as a substitute of trust. Because interdependence is obtained throughout several relationship stages as the parties invest in the relationship and establish common achievable goals, the *in plant* situation may be expected to be associated with a high level of interdependence between the parties. Furthermore, as a consequence of the intensive information exchange and the expected long length of relationships, there is a strong possibility of relational norms emerging naturally (i.e. implicit or tacit norms).

The '*Project Network*'

A project is an example of a situation where there is *interimistic* relational exchange (Purchase and Olaru 2004). What typically happens in a project situation is for a group of companies to get together for a (usually) short period of time, with the sole purpose of delivery or having delivered one final product or service. Moreover, once the project is finished or once the contribution of each specific actor is complete, each company goes back to their *normal* activity or may get involved in other

[1] E.g. in the rigid plastic containers activity, the plastic bottles are delivered directly into the machinery that does the filling of the bottles (with the partner's product); the suppliers' dedicated units are located next to the partners' filling equipment.

projects with the same companies as before or others[2]. Contractors are thus constrained by time, cost and quality (Cova and Hoskins 1997). This fact confers this form of *interimistic exchange* with high complexity and it may be expected that it presents several distinctive features from those that may be expected to be found in a long-term relationship.

To begin with, in a project situation, the existence of long-term business relations can not be taken for granted (Cova and Salle 2000), with contractors having to deal with situations of discontinuity in relationship with clients (Cova and Hoskins 1997; Cova et al. 1994; Cova et al. 1996; Cova and Salle 2000). The length of transactions and frequency of contacts between the parties are expected to be considerably low, and thus there is no place for an increasing interdependence between the involved parties (Cova and Hoskins 1997; Cova et al. 1994). Also, there is less time for trust to evolve than in a long-term relationship. To overcome the time constraint, the parties are believed to extensively and commonly rely on prior exchange relationship interactions, on the parties' reputation for fair dealing, as well as on those relationship-specific investments that are made in the early stages of the relationship (Lambe et al. 2000).

Also, it may be expected that on both the client's and the contractor's side, a large number of actors are involved in its definition and execution (Cova et al. 1994). This adds complexity to the project and implies a commonly complex coordination of the activities between companies. On the client's side, there may be stakeholders, regulatory bodies, government departments and other, whilst on the contractor's side there may be consultants, sub-contractors and other.

One other relevant feature is every project's expected particularity (Cova and Hoskins 1997). There is no place for a standardised offer since there is not a standardised demand and as a result, it is almost impossible to anticipate opportunities, leading to a considerable uncertainty on the contractors' side (Cova et al. 1994). Furthermore, a project usually involves considerable specific investment by the involved parties (Cova et al. 1994). Preparing a proposal, winning it and executing the project, usually implies a considerable investment of resources on the contractor's side.

[2] It may also happen that both parties continue to be involved after a particular project, in the case that there is more than one project aligned or in the case that there are plans for supplying or being supplied with equipments or other after the project has been concluded.

One final interesting feature is that given the particularity, as well as the possible absence of pre-existing relationships, the value of the contract, the difficulty in predicting cost and the high uncertainty associated to projects, there is likely to be a high degree of formalisation associated with a project's negotiation and execution process (Cova et al. 1994). Relational norms or the expectations about the other party's behaviour, emerge during several stages of the relationship development period (Dwyer et al. 1987; Hakansson 1982; Wilson 1995) and interaction leads to the materialisation of relational norms which can be more or less tacit (Dwyer et al. 1987). However, since the relations involved in a project situation are usually short-term, there is not enough time for mutual relational norms to emerge. One of the solutions that the parties may implement is the one presented here i.e. that of relying on explicit norms that are established by the contractual terms. This formalisation can be observed mostly in public markets where inclusively, such as the interaction between sellers and buyers during the bidding stage is prohibited by the law applicable to these markets (Cova et al. 1994). Moreover, as a result of the likely complexity and the usual length constraints that make difficult the development of interdependency between the involved parties, the negotiated contracts may be expected to be as comprehensive as possible.

7 The Role of Network Contextual Factors for the Formation of Individual Perceptions of the Business Network

The cluster analysis described in the methodology section showed a significant commonality within network pictures from the same network, pointing to the relevance of network contextual factors in the formation of individual perception of the surrounding business network. Network pictures from Cluster 1 included around 30% of all respondents, and included mostly respondents from the '*Product Network*'. Most respondents from Cluster 2 were from the '*Project Network*'; this cluster included about 47% of respondents. Finally, respondents from Cluster 3 and from Cluster 4 represented the remaining 23% of respondents and they included mostly respondents from the '*Product Network*'. Therefore, there were two main clusters (i.e. Cluster 1 and Cluster 2), each

corresponding to respondents from a network; the remaining two clusters represented specific ways of perceiving the network within the '*Product Network*'.

Considering the most commonly traced features of network pictures found for Cluster 1 and for Cluster 2, we identified four network factors that provide possible explanations for the encountered differences between network pictures from the two clusters (see table 3).

FACTOR 1 – <u>Complexity</u>

A considerable complexity characterised both the '*Product Network*' and the '*Project Network*' and this contextual factor appears to have conditioned the way most of the respondents from these two networks and clusters perceived their world.

In the '*Product Network*', the large number of people involved in the processes, the high investment levels and the intensive linkage between actors were just some of the elements that conferred a strong complexity to the situation of a hole-through-the-wall system. Respondents from this network were frequently fascinated with this system's distinctive attributes and very frequently talked about the processes it involved. The complexity associated with the '*Product Network*' conditioned how respondents perceived the business network as follows: 1) respondent from Cluster 1 aggregated actors and situations, an activity that may be understood as a technique that can be used to deal with complexity, and 2) they considered actors' internal features as relevant, given that it helped them to understand the complex processes that could take place between companies.

In the '*Project Network*', respondents appeared to be overwhelmed with the Metro Project's considerable dimensions and with all the coordination of activities and efforts that were involved. Most respondents did not have any interest in knowing about situations or actors that were not directly associated to the project, not being willing to invest their resources for finding out more and thus narrowing their 'horizon' to the project's context. This may be understood as a technique actors use to deal with the project's inherent complexity: the situation was already complex enough to deal with in such a short period of time and thus there was no point in knowing what was beyond it. The complexity associated with the project and the described technique were reflected in the following features of respondents' network pictures: 1) respondents from Cluster 2 showed great interest in

knowing as much as possible about what was going on around them, nevertheless restricting their interest to the project, and by so doing establishing boundaries to the implicit complexity; 2) they thoroughly described the surrounding actors' structural features, but included solely those actors directly involved in the project and their features within the project and 3) these respondents placed great focus on their own company as well as on their surroundings, but restricted these surroundings to the boundaries of the project.

FACTOR 2 – <u>Continuity</u>

Whilst there was a strong continuity associated with the '*Product Network*', the '*Project Network*' was characterised by an expected and natural discontinuity. In either case, continuity or the lack of it, it appeared to be a factor that had conditioned the way respondents perceived the network.

In the '*Product Network*', continuity was observed at two levels: there was continuity in relations between companies and there was a high level of permanency of people in the business. Apparently, this conditioned the way respondents perceived the world in the sense that it led them to rely very strongly on past experiences and past events, to develop their current framework of their surroundings and they were willing to invest their resources in finding out what was going on in the world. The observed continuity conditioned the way they perceived the network in the following terms: 1) respondents from Cluster 1 saw the world as processes between actors, by describing the continuous relationships involved in a 'hole-through-the-wall' system; 2) they held an evolving view of their surroundings, thinking about how relations and actors changed over time; 3) these respondents presented an overall consistent and structured view, something usually associated with an introspection process over a period of time and 4) they aggregated actors and situations as a result of the archetypes they had developed through their experience.

On the other hand, particularness and discontinuity between projects were two underlying features of the '*Project Network*'. As a result of this discontinuity, respondents were not willing or able to capitalise on previous experiences that they had acquired through their participation in other projects. Each project was considered very particular and so was the role assumed by each company within it. Participants considered it fairly unimportant to bring previous experiences to the current project and

their framework for analysis was the ‘immediate’ which corresponded to the project’s time span. Additionally and also associated with the short (or medium) term and transitory character of the relationships, they did not see any point in trying to develop implicit rules, preferring instead to rely on the explicit ones. Moreover, they did not think it was worth investing their resources trying to get to know what was going on beyond the project. Thus, the project’s discontinuity was reflected in the way respondents perceived their world in the following terms: 1) respondents from Cluster 2 were unable or unwilling to aggregate actors or situations, preferring to think about specific actors and situations; 2) these respondents held a prescriptive view of the world, relying on explicit rules and 3) they restricted their ‘horizon’ to the project, only showing interest in those actors’ structural features who were within the project and focusing on the project related issues.

FACTOR 3 – <u>Embeddedness</u>

The level of embeddedness with regards to the sector in which companies developed their business activity, also conditioned the way respondents perceived the world.

Companies included in the ‘*Product Network*’ were developing business activity in the plastics sector, a sector where companies had been interacting for a number of decades. This conditioned how respondents perceived the network in various ways. They clearly considered the sector’s features as a relevant factor, because they frequently talked about them, highlighting the international trend towards concentration that was taking place and how people involved in this sector had been working in it for a long time. They also mentioned quite frequently the substantial rotation of people between companies and how, at the end of the day, it was mostly about the same core group of people that had been around for a long time. This substantial level of embeddedness for the sector where companies and people had been involved for a considerable period of time, had shaped the way the respondents perceived the world in a number of ways. To begin with, 1) the interviewees included in Cluster 1 saw their surroundings predominately as actor bonds, highlighting the importance of old contacts and relations in the sector and relegating the coordination of activities and the investment in relationships to a secondary level of importance. In the plastics sector personal contacts were believed to play a crucial role in the development of companies’ business activities.

Moreover, 2) these respondents held a normative view of their surroundings, one that was drawn mainly from the implicit norms that traditionally underlined this particular sector. Furthermore, 3) respondents from this Cluster 1 saw the world in terms that could be described as that of a network, but they frequently claimed that they saw a supply-chain and the latter appeared to correspond to the sector's institutionalised model to gain understanding of the world, that could often be found in the relevant literature.

On the other hand, in the situation of the '*Project Network*' [n.b. not a sector] companies were involved in a context characterised by a set of companies that got together solely to carry out a specific project. Because there was no set of typical practices or institutionalised ways of looking at actors or processes that would had been developed over time as relationships had evolved, they were left somewhat dependent on relying on what was established by contractual arrangements. That is, there was little if any embeddedness of previous experience and relationships. This conditioned how respondents perceived the world as follows: 1) respondents from Cluster 2 had strongly normative and stereotyped views of their world, which were determined by the established contractual arrangements and not by previous rules or frameworks that had been developed and 2) since there were no archetypes of situations / actors institutionalised in this setting, they thought mainly about specific actors / situations, thus choosing not to aggregate them.

FACTOR 4 – <u>Formality</u>

The level of importance given by respondents to those rules formalised by contractual terms appeared to have strongly conditioned how they perceived their surroundings.

In the '*Product Network*', formality did not assume a central role and respondents did not think very often about the explicit rules established between parties for managing relationships. They hardly ever mentioned the contractual or legal aspects of such communications. Usually they were involved in long-term relations, involving private assets and there were only two entities directly involved in any buying or selling situation. Formal and explicit rules did exist, but respondents preferred to rely on implicit ones, ways of perceiving things and of acting that were developed over time between the parties or that were strongly associated with the way business was conducted in the sector. This

substantial avoidance of formality resulted in the following features for these respondents' network pictures: 1) respondents in Cluster 1 held a normative view of the world which was drew upon implicit rules and 2) their stereotyped view of the world was usually associated with frameworks institutionalised in the sector and not with those that had been established by legal bonds.

On the other hand, formalised rules for managing in relationships were strongly taken into account by respondents in the '*Project Network*'. These explicit rules were constantly on the respondents' minds and guided the way they perceived the world. The importance given to these rules may be understood as a technique used by them to deal with the existing complexity. This resulted from the large number of parties directly and indirectly involved, the intense activity linkage, and from the strong time restrictions placed upon the relationships. Respondents from the '*Project Network*' appeared to be very much preoccupied with the contractual aspect of the project and this substantially restricted their views of their surroundings. To begin with, 1) interviewees in Cluster 2 held a normative view that relied mainly on explicit rules stated in the contracts. So instead of developing implicit rules, respondents preferred relying solely (or mostly) on the contracts. Moreover, they 2) saw the world in terms that were coherent with the board's explicit identity and were complicit with that it. In addition, 3) respondents from Cluster 2 held a stereotyped view of their surroundings, describing them either as a hierarchy or as a matrix of functions. These were the frameworks that had been stipulated in the formal contract to describe those relations between the involved parties. Furthermore, 4) they held an evolving view, frequently talking about the changes that took place throughout the duration of the project that were formally written into the legal arrangements. Also, 5) they described their surroundings as activity links and highlighted companies' internal procedures and again these issues were clearly stated in the established contracts. One further common feature of their network pictures was that 6) these respondents held a structured and overall consistent view of the world, in that they exhibited marked acceptance of what had been formally agreed on this matter. Finally, 7) respondents from this Cluster saw the world simultaneously as a potential arena for conflict and collaboration, containing actors as providers for

customised solutions, where the terms of these interactions were overseen by bodies that had been established in the formal contracts.

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Insert Table 3

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Although it is not possible or intended to generalise the identified correlations between the four network factors identified for these two particular networks and the dimensions of actors' network pictures, they are nevertheless revealing. It suggests that there is something about the world in which actors develop their daily business activity that conditions what and how they perceive it. Other factors might be found to be influential if networks of a different nature were analysed.

Following this clustering analysis, we compared the extent of within-network similarity of the captured network pictures to assess if there was any relation between this similarity and the strength of ties between individuals, the strength of shared norms and practices, and the clarity in the definition of network boundaries. It emerged that there was greater commonality or similarity amongst network pictures captured in the '*Project Network*' than in the '*Product Network*'; that is to say, there was a stronger coherence in the way respondents from the former network perceived the world. Possible reasons for the apparent existence of greater commonalities in the '*Project Network*' are suggested here. What comes across very strongly from the examination of the features of network pictures from the '*Project Network*' is the compliance of the participants with the legal arrangements set up at the project's inception and occasionally modified to take into account changes over time. This apprehension of fulfilling the high level of demands, as determined by the contract, could well have had the effect of pulling people together and making them feeling that cooperation and minimising differences was the best way to achieve the desired results. Moreover, there were extremely strong ties between the individuals involved in this network, not only because of the felt need of working together for achieving the underlying short-term aims of the project, but also because of the very reduced number of individuals directly involved in the project. The directly involved parties were geographically enclosed to a particular location, and thus the boundaries of the

network were clearly defined not only by the contract as also geographically. The high level of commonality of the network pictures in the '*Project Network*' could thus be said to be the consequence of three factors. Firstly, the project (i.e. the contract) determines the way people are expected to work and gives little opportunities for differences, thus leading to similar perceptions of the world (Argyris and Schon 1978; Porac and Thomas 1990; Porac et al. 1989). Secondly the sense of threat, in terms of meeting deadlines and not incurring sanctions through failure to deliver, draws people together to achieve the same goal and strengthens the ties between them, and to be successful they have to more or less see things is a similar way and overcome any differences (Granovetter 1985). Finally, because actors directly involved in a project are geographically bounded, there is an intensive on-going face-to-face interaction, resulting in participants sharing a similar view on several aspects (Porac and Thomas 1990; Porac et al. 1989; Porac et al. 1995). The '*Product Network*', by contrast, can be seen to have greater leeway for being able to make mistakes, because in long-term relationships like this, errors have time to be rectified. These findings therefore corroborate with the ideas on within-network similarity that were put forward by Rohrmus et al.'s (2006): stronger shared norms and practices, stronger ties between individuals, and clearer definition of network boundaries are expected to lead to more similar within-network network pictures.

8 Conclusions

The paper analyses how contextual factors of the business network affect individual managers' perceptions of that business network. We used a pre-tested dimensional model of network pictures to capture views from multiple respondents in two different networks and compared the network picture characteristics between the two networks. We found that network pictures characteristics are associated with some network features. For example, a high level of complexity as the one that underlies relationships in the '*Project Network'*, results in respondents commonly restricting their Focus on Actors to their company and to other directly involved in the project. This can be interpreted as a technique that network participants use to simplify the recognized complexity of business relationships. Moreover, a low level of continuity underlying relationships like the one that

can be found in the '*Project Network*', in reflected in a high Normative Weight of respondents' perception of the network. This normative perspective of the network participants draws almost purely on explicit rules, result of not being enough time for implicit rules to be developed. Furthermore, a high level of embeddedness in the sector where actors developed business activity as the one that characterises the '*Product Network'* results in a higher Overall Stereotyping of actors' perceptions. The stereotyping that takes place reflects the way things are traditionally perceived in the network. Finally, a high level of importance played by formalisation as the one associated with the '*Project Network*' results in managers showing a high level of Coherence with their Company's Board Explicit Identity. The coherence is between the way managers perceive the business network and what is stated in the contractual terms. Besides identifying the network features that affect the characteristics of network pictures, we have also compared the extent of within-network similarity and found evidence for the following assertions: strong shared norms and practices, as well as strong ties between individuals, and a clear definition of network boundaries result in more similar within-network network pictures. This corroborates with the ideas put forward by Rohrmus and Henneberg (2006) on within-network similarities.

8.1 Main Contributions

This paper represents a theoretical contribution, adding to the existing literature on managers' cognition in business networks. In particular, it addresses the role played by network contextual factors on network picture formation. The paper also makes a noteworthy managerial contribution, providing managers with a simple way to have an idea on how actors' views of the business network may look like. The identified network features, i.e. complexity, continuity, embeddedness, and formality, can be easily used by researchers or practitioners at the initial stage of a network analysis to get a sense of how subjective network pictures are going to be like. However, because the identified correlations between network contextual factors and the features of network pictures are not direct and must be understood as 'associative', researchers and practitioners must be aware of the limitations linked to the usage of these factors for grasping network perceptions.

8.2 Limitations and Avenues for Future Research

The main limitation of this study is associated with the choice of two particular networks that have very specific features. If other networks had been selected, other network contextual factors may have been identified. Nevertheless, this research represents a significant contribution for a better understanding of managerial cognition in complex business networks Future research needs to complement these findings, e.g. by exploring how individual and organisational features affect actors' network pictures. The relationships between these two sets of factors (individual/organisational on the one hand, and structural/network on the other), and individuals' cognitive schemata has been frequently mentioned in other bodies of literature (Abrahamson and Fombrun 1994; Hambrick and Mason 1984; Hodgkinson and Johnson 1994; Ireland et al. 1987; Lawrence and Lorsch 1967; March and Simon 1958) but it has hardly been investigated within the business network tradition.

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Figure 1

Overview of the dimensional model of network pictures

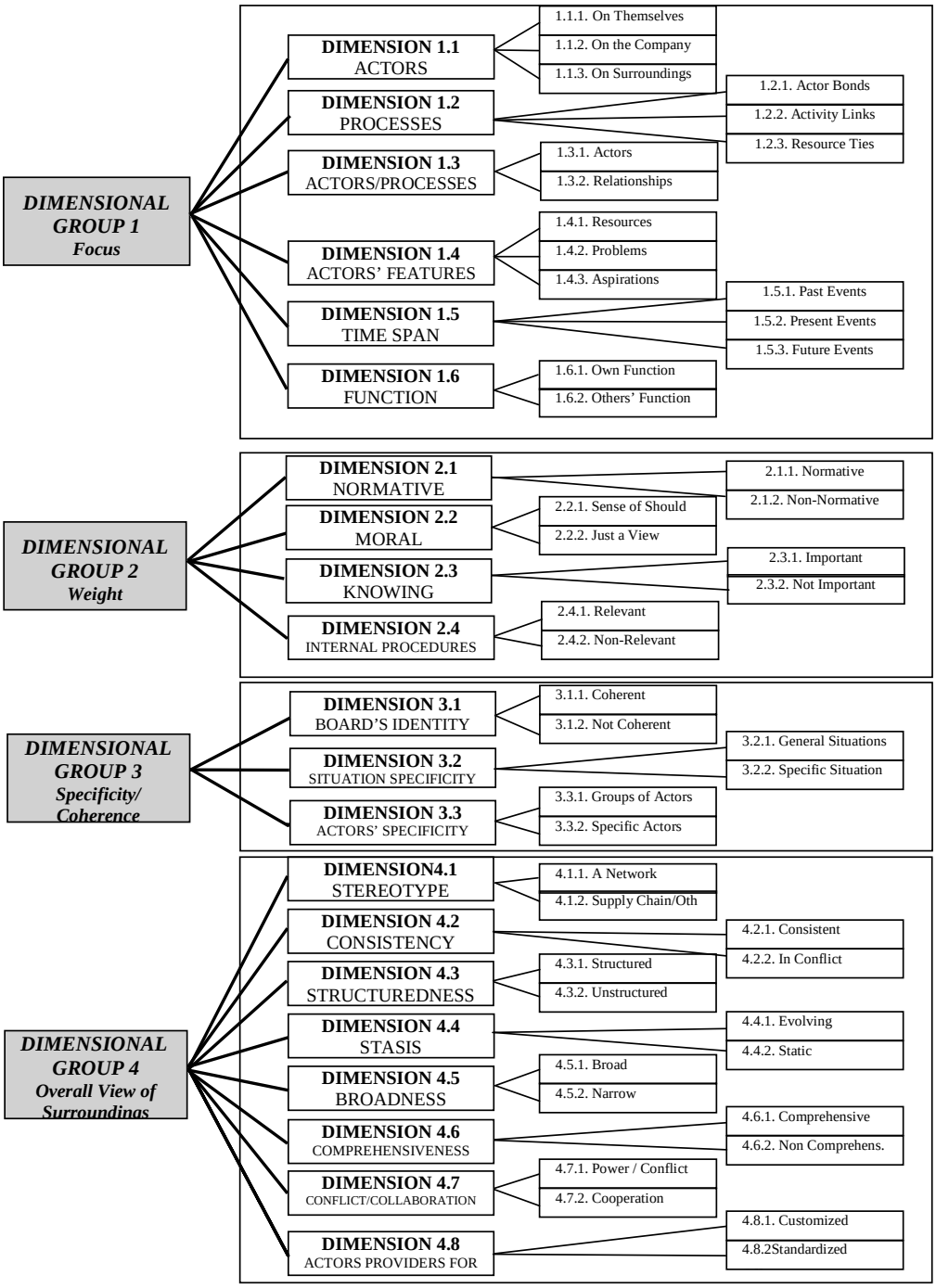

Table 1.

Brief definition of network pictures dimensions

Groups	Dimensions	Definition
Dimensional Group 1. Focus	1.1 Actors	Characterises an actor view with regard to his/her perception on who is the 'focal' actor or groups of actors in the network;
	1.2. Processes	It is about the element(s) of relationships that an actor thinks more intensively about;
	1.3 Actors / Processes	Reflects whether an actor perceives the surroundings network as a set of relevant actors or/and in terms of relationships between those actors;
	1.4 Actors' Features	It is related to those structural features of the surrounding actors that an actor thinks more intensively about;
	1.5 Time Span	It addresses which distinct periods of time an actor thinks more intensively about;
	1.6 Function	Reflects whether an actor thinks more intensively about a particular departmental function or not.
Dimensional Group 2. Weight	2.1 Normative	Allows characterising actor perceptions in terms of whether he/she knows what should or should not be done so that success can be achieved in business practices;
	2.2 Moral	It is about whether there is an moral philosophy underpinning the way an actor perceives the world;
	2.3 Know What is Going on	Reflects if an actor considers it to be important or not to be aware of what is taking place in the surroundings, no matter how much it is related to his/her activity;
	2.4 Internal Procedures	Addresses the extent to which an actor considers important knowing about actors' internal processes.
Dimensional Group 3. Spec./Coher.	3.1 Coherence with Board Identity	Reflects whether an actor agrees with the principles that his/her company's board explicitly states for the organization;
	3.2 Situation Specific.	It is about the extent of detail to which an actor thinks about situations;
	3.3 Actor Specificity	It is about the extent of detail to which an actor thinks about actors;
Dimensional Group 4. Overall View	4.1 Stereotype	Characterises the view held by an actor in terms of the distinct forms of visual representation or framework that he/she uses to represent the surrounding network;
	4.2 Consistency	Reflects if an actor sees things in a more or in a less comprehensively coherent way;
	4.3 Structuredness	It is about whether an actor perceives the world in a more or less structured and organised way;
	4.4 Stasis	It is associated with the extent of dynamism that an actor perceives existing in the network;
	4.5 Broadness	Characterises an actor view with regards to the scope of an actor perception of the surrounding network;
	4.6 Comprehensiveness	It is about the extent of specificity associated with an actor view of the network;
	4.7 Conflict / Collabor.	Characterises an actor view in terms of whether he/she sees the surrounding in terms of conflict/collaboration situations;
	4.8 Actors as Providers	Defines how an actor perceives the surrounding actors in term of services provided.

Figure 2

Companies and direct relationships included in the '*Product Network*'

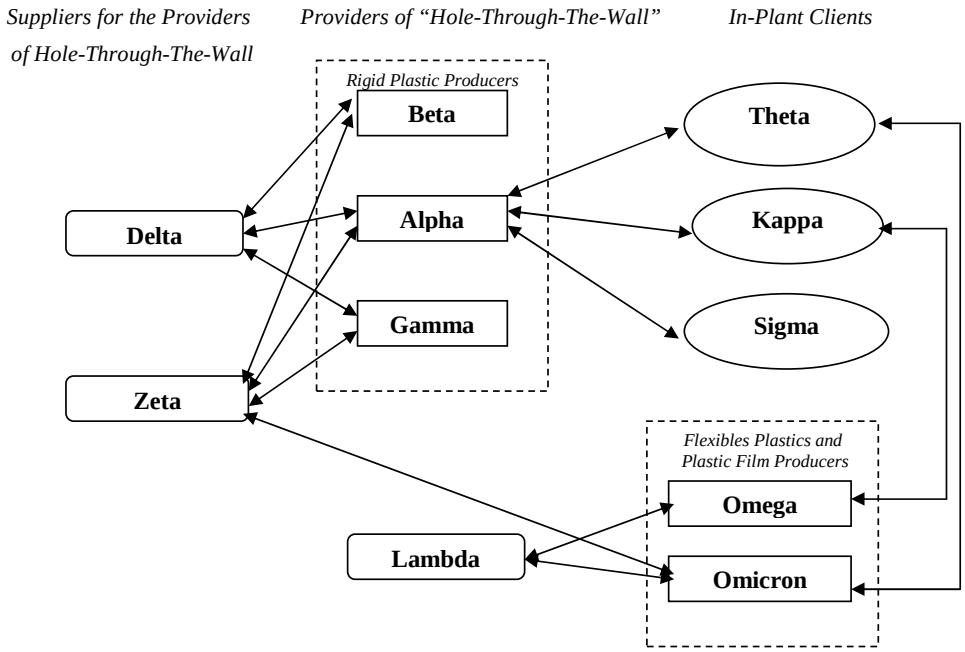

Figure 3

Companies and direct relationships included in the '*Project Network*'

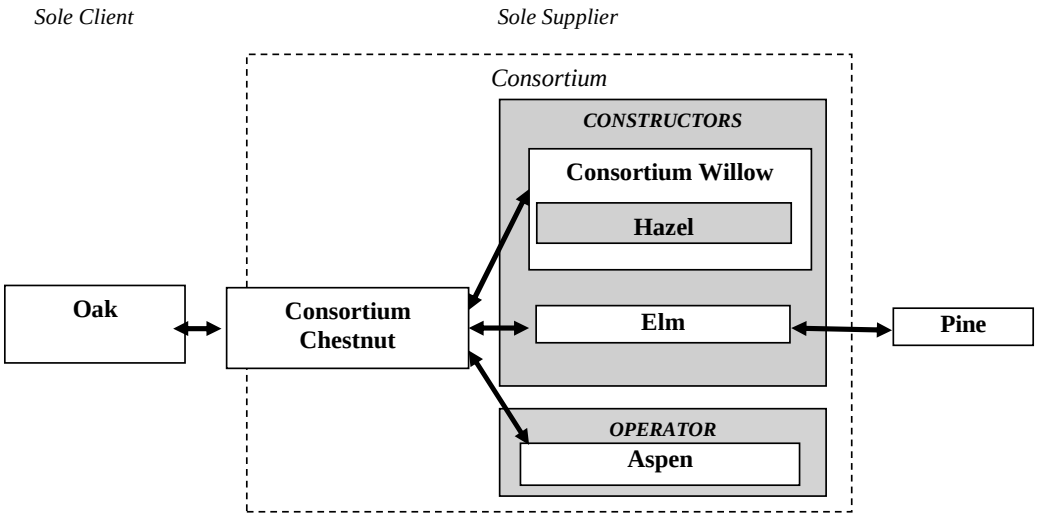

Table 2

Respondents from the '*Product Network*'

'Hole-Through-Wall':	**Company's Name**	**Function in the Company**
PROVIDERS FOR 'HOLE- THROUGHT -THE-WALL'	**Alpha**	1. Commercial Director (PT)
		2. Commercial Director and KAM (IT)
		3. Operations Director
		4. RM Purchasing Director
		5. LPTD Director (R&D)
		6. International Technical Director
		7. Technology Director
	Beta	1. CEO (and all other)
	Gamma	1. Financial Director
		2. International Director
		3. Production Director
	Lambda	1. *In-Plant* Director
SUPPLIERS OF PROVIDERS FOR 'HOLE-THROUGHT-THE WALL'	**Delta**	1. CEO 2. Logistics Director 3. Production Director
	Zeta	1. CEO 2. Commercial Director 3. Production Director
CLIENTS OF 'HOLE-THROUGHT-THE WALL'	**Theta**	1. Production Director
	Kappa	1. Production Director
	Sigma	1. Production Director
	Omega	1. CEO 2. Commercial Director 3. Financial Director 4. Production Director 5. IT Director
	Omicron	1. Commercial Director

Table 3

Respondents from the '*Project Network*'

PROJECT:	**Company's Name**	**Function in the Company**
PROVIDERS	**Chestnut**	1. CEO
		2. Construction Coordinator
		3. Planning and Controlling Director
		4. Commercial/Contractual Director
		5. Technical Director
	Willow	1. CEO
		2. Planning Director
		3. Commercial Director
		4. Production Director
	Aspen	1. CEO
		2. Project Director
		3. Operations Director
	Hazel	1. CEO
		2. Production Director
	Pine	1. CEO
		2. General Coordinator
	Elm	1. CEO
		2. Operations Director
		3. Technical Director
CLIENT	**Oak**	1. Operations Director 2. Communication & Image Director 3. Infra-Structures & Production Director

Table 4 Summary table with associations that may be expected to be found, with regards to the identified network contextual factors and network pictures dimensions in both the networks under consideration

FACTORS → ***NETWORKS*** ↓	**Factor 1. Complexity**	**Factor 2. Continuity**	**Factor 3. Embeddedness**
'Product Network'	▪ Complexity of "hole-through-wall": o Large number actors; o Intensive Linkage. ▪ Respondents fascinated with 'hole-through-wall'.	▪ Expected continuity at two levels: o Relations between people; o Permanency of same people. ▪ People relied strongly on past experiences (affects frameworks).	▪ Plastic Sector (a sector with tradition). ▪ Frequently mentioning characteristic of sectors, trends (M&A), peopl being involved for a long time, stron rotation of people between companies
(Respondents in Cluster 1)	▪ *How it conditions Network Pictures:* **1.** Groups of actors (aggregation); **2.** Relevance of internal procedures.	▪ *How it conditions Network Pictures:* **1.** Surroundings as processes; **2.** Evolving view; **3.** Consistent and structured; **4**. Groups of actors and situations.	▪ *How it conditions Network Pict* **1.** Network as actor bonds; **2.** Normative view (implicit rules); **3.** Supply chain vs a network; **4.** Groups of actors (aggregation).
'Project Network'	▪ Complexity of the project: o Few factors but of a large dimension; o Intensive Linkage. ▪ Respondents overwhelmed with project's dimensions and everything it involved. ▪ Narrowed views to things directly related to project – way of dealing with complexity (too complex).	▪ Expected discontinuity between projects. ▪ People not willing to capitalise on previous experiences acquired in other projects – particularity. ▪ Level of analysis – immediate.	▪ No relevant tradition.
(Respondents in Cluster 2)	▪ *How it conditions Network Pictures:* **1.** Structure solely within project; **2**. Focus on company and surroundings (only project related); **3.** Actors' resources, problems and aspiration (only project related).	▪ *How it conditions Network Pictures:* **1.** Specific actors and situations (not aggregating). 2. Normative View (Explicit rules) 3. Focus on Surroundings (only project related); 4. Actors' resources, problems and aspirations (only project related).	▪ *How it conditions Network Pict* **1.** Specific actors and situations; **2.** Normative view (based on explic rules) ; **3.** Stereotyped view (relying completel on what is established by contract).